Classifying exchange rate regimes: a statistical analysis of alternative methods

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Abstract

Four different schemes for classifying exchange rate regimes are compared for developing countries. Disagreements are substantial, and alternative schemes disagree as much with each other as with the official scheme. Only the official scheme shows a trend towards floating

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1. INTRODUCTION

In recent years there has been a proliferation of alternative schemes for classifying exchange rate regimes, but little systematic comparison between them. We compare the official (IMF-reported) classification of exchange rate regimes with three alternative schemes for a large sample of developing countries (excluding transition economies) over the period 1985-2000. It is shown that different alternative schemes produce markedly different classifications, both from each other and from the official scheme, and display much less of a trend towards greater flexibility than is evident in the official scheme. Agreement between classification schemes has not increased over time, as one might have expected given the intellectual shift in favour of policy transparency over the period.

2. CLASSIFICATION SCHEMES

In recent years various alternative schemes for classifying exchange rate regimes have been proposed, based not on what countries claim, but on the realised behaviour of the nominal exchange rate and (sometimes) other indicators of exchange rate intervention. Since an important motivation for this research effort has been the perception that countries have not infrequently been following a different regime from that claimed, one would expect alternative schemes to agree more with each other than with the official scheme. Unless they do, their claim to be a more accurate measure of the "true" regime than the official classification is somewhat hollow. Here we examine this issue for a data set that covers 74 developing countries (excluding transition economies) over the period 1985-2000.

In order to keep things simple we use a highly aggregated system of regime classification, and we exclude all high-inflation observations with consumer price inflation over 40 per cent *per annum*, for which a regime classification is somewhat artificial because of the inevitability of sharp nominal depreciations. Regimes are aggregated into three categories as follows:
1) Hard Pegs (No Separate Legal Tender, Currency Board);
2) Soft Pegs (Peg to a Single Currency, Peg to a Composite of Currencies, Crawling Pegs and Bands, Limited Flexibility);
3) Floats (Managed Floating, Independently Floating).

Hard pegs include countries with a common currency (e.g. the CFA zone) as well as those that have adopted the currency of a larger country (e.g. Panama). Because the definition of hard pegs is relatively uncontroversial (and not all classification schemes separate them out from soft pegs), we use the identical definition of hard pegs for all schemes. This leaves us with a binary choice: a soft peg or a float.

For the official classification, we take the IMF classification given on the "Exchange Rate Arrangements" page of *International Financial Statistics* on 31 December. We then consider three alternative schemes: those of Levy-Yeyati and Sturzenegger (2005) [YS], Shambaugh (2004) [JS] and Reinhart and Rogoff (2004) [RR]. The YS scheme is designed as a wide measure of policy intervention, and uses cluster analysis based on the

volatility of exchange rates, interest rates and international reserves through the calendar year. The JS scheme is essentially designed to separate pegs from non-pegs based on nominal exchange rate movements. It allows for at most one significant devaluation during a year. The RR scheme uses exchange rates in the parallel market, where this exists, rather than the official market, and employs a relatively wide definition of a peg or band that discounts large movements in up to 20 per cent of the observations within a identified episode (see the references for more details).

3. ANALYSIS

Table I shows that, just in terms of distribution, these schemes produce markedly different results.

Table I. Basic statistics on classification schemes

Classification	Proportion of floats (%)	Persistence
IMF	41.1	0.87
JS	71.0	0.83
YS	45.7	0.46
RR	28.2	0.90

Notes: The data refer to a common sample of 617 observations excluding those that are hard pegs and with inflation > 40 %. Persistence is the correlation coefficient between classifications in successive years (float = 1; soft peg = 0).

The proportion of floats varies from a low of 28.2 per cent for RR to a high of 71.0 per cent for JS. This variation largely reflects judgements about how stringently to define a peg or band (i.e. how wide a range of fluctuation to accept). Note that regimes change relatively rarely in all classifications except YS, where persistence is markedly lower, presumably because the measured volatility of reserves and interest rates varies much more from year to year than does the volatility of exchange rates on which other schemes focus.

How much agreement is there across classification schemes? Table II presents the raw correlations, together with an adjusted measure that corrects for a downward bias caused by the difference in the mean proportion of floats. The adjustment allows for the fact that, if two classifications identify different proportions of floats, there must be disagreements at least equal to the difference between means (the maximum raw correlation is one minus the difference in means, so the adjustment divides by this to restore a maximum of one).

Table II. Correlations between classification schemes

	IMF	JS	YS	RR
	Raw correlations			
IMF	1			
JS	0.365	1		
YS	0.281	0.379	1	
RR	0.154	0.083	0.054	1
Mean	*0.267*	*0.275*	*0.238*	*0.097*
	Adjusted correlations			
IMF	1			
JS	0.520	1		
YS	0.295	0.507	1	
RR	0.176	0.145	0.065	1
Mean	*0.330*	*0.391*	*0.289*	*0.129*

Notes: The data refer to a common sample of 617 observations excluding those that are hard pegs and with inflation > 40 %. Adjusted correlations are raw correlations divided by one minus the difference in means shown in Table 1.

It is noticeable that even the adjusted correlations (which are necessarily larger than the raw ones) are quite low, with only two out of six exceeding 0.3. The RR classification, which is based on parallel rates (where they exist) has a particularly low correlation with the other classifications. Only in the case of YS is there significantly greater agreement with another alternative classification (JS) than with the official classification. This means that it is likely to matter, in any empirical work, not only whether the IMF or an alternative classification is used, but *which* alternative classification (for some evidence on this, see Bleaney and Francisco, 2006).

These relatively low correlations mean that there is even less agreement between classification schemes in the identification of dates when there was a *switch* of regime. Table III shows the correlations between switch dummies (=1 for a year when a switch is identified; = 0 when it is not) for the four classifications. The correlations all lie in the range 0.07 to 0.16 (and this includes some cases where different classifications identify switches in opposite directions in the same year!).

Table III. Correlations between regime switches

	IMF	JS	YS	RR
IMF	1			
JS	0.122	1		
YS	0.072	0.156	1	
RR	0.111	0.111	0.092	1
Mean	*0.102*	*0.130*	*0.107*	*0.105*

Notes: The data refer to a common sample of 545 observations excluding those that are hard pegs and with inflation > 40 %, with a switch of regime between a soft peg and a float defined as one and no switch as zero.

According to the official classification scheme, there was a marked increase in floating amongst developing countries over the period 1985-2000. It has been suggested that developing countries tend to manage floats heavily, particularly in order to mitigate the balance sheet effects of real exchange rate movements when many liabilities are denominated in foreign currency (Calvo and Reinhart, 2002; Hausmann *et al*., 2001). If that is the case, then any time trend in favour of floating should be much weaker according to the unofficial classifications. The results shown in Table IV support this hypothesis. All classifications display a markedly greater likelihood of floating at higher inflation rates, but after controlling for this effect the alternative schemes have a much smaller rate of increase in floating over time (although still significant in two out of three cases).

Table IV. Floating as a function of inflation and time

	Classification scheme			
Regressor	IMF	JS	YS	RR
Constant	0.22 (8.51)	0.53 (20.5)	0.252 (8.06)	0.040 (1.35)
Inflation rate	0.017 (8.24)	0.014 (6.70)	0.013 (5.61)	0.025 (11.1)
Time	0.0328 (11.1)	0.0078 (2.69)	0.0135 (5.61)	-0.0032 (-1.02)
R-squared	0.138	0.044	0.043	0.146
Sample size	1051	1051	771	783

Notes. Dependent variable =1 for float and 0 for soft peg. Sample is soft pegs and floats excluding observations with inflation > 40 %. Figures in parentheses are *t*-statistics. Time=0 in 1990.

Finally, we ask whether there has been any trend towards greater agreement between classification schemes over time, after controlling for inflation effects. We do this by

setting up a dependent variable that is equal to one if there is agreement between a pair of classification schemes that a country was floating/pegging in a particular year, and zero if there is a disagreement. Then, for each pair, we estimate the probability of agreement as a function of the inflation rate and a time trend. Table V shows the results for each pair.

It is clear from Table V that there tends to be more agreement at lower inflation rates – the inflation coefficient is significantly negative in three out of six cases (all involving the YS scheme as one of the pair), and insignificant in the other three. On the other hand there is no consistent picture for the time trend – the coefficient is significantly positive for the IMF/JS pair, significantly negative for the IMF/YS pair, and insignificant for the rest.

Table V. Probit analysis of agreement between classification schemes

	Regressor			
Pair of classifications	constant	Inflation rate	Time	Sample size
IMF JS	0.19 (2.63)	0.001 (0.13)	0.0303 (3.73)	1051
IMF YS	0.65 (87.48)	-0.019 (-2.85)	-0.0192 (-1.98)	771
IMF RR	0.06 (0.69)	-0.003 (-0.49)	0.0133 (1.43)	783
JS YS	0.71 (8.17)	-0.028 (-4.27)	-0.0037 (-0.39)	771
JS RR	-0.23 (-2.60)	0.011 (1.61)	0.0093 (0.99)	783
YS RR	0.37 (3.64)	-0.027 (-3.64)	0.0100 (0.95)	614

Notes. Dependent variable =1 for agreement on a float/soft peg classification and 0 for disagreement. Sample excludes hard pegs and observations with inflation > 40 %. Figures in parentheses are *t*-statistics. Time=0 in 1990.

These results highlight the problems of developing a satisfactory scheme for classifying exchange rate regimes. It could be argued that these schemes focus too much on the nominal exchange rate and not enough on the real exchange rate. A crawling peg may stabilise the real exchange rate extremely effectively, and yet it tends to be classified as a significantly more flexible regime than a horizontal peg, even though the latter may be subject to substantial real exchange rate appreciation because of inflation differentials. This type of consideration seems to underlie Reinhart and Rogoff's (2004) controversial decision to use parallel rates. An alternative approach would be to consider real exchange rate volatility more explicitly.

4. CONCLUSION

We have compared the outcomes of different classification schemes for exchange rate regimes for a sample of 74 developing countries (excluding transition economies) over the period 1985-2000. The level of agreement is disappointing, with no improvement over time. There is particularly little agreement on the dating of switches of regime. There is no greater degree of concordance *amongst* unofficial schemes than *between* unofficial schemes and the official scheme, despite the widespread perception that countries are often deviating from their declared regime. This rather undermines the claim of *de facto* measures to identify exchange rate regimes more accurately than the official measure. It also implies that, in any empirical work, results may vary significantly depending on the classification scheme used. The trend towards a greater popularity of floating evident in the official classifications is smaller or non-existent in the unofficial alternatives, which lends some support to the hypothesis that developing countries are anxious to intervene in order to control real exchange rate volatility under floating, perhaps because of the fear of its impact on balance sheets when liabilities are denominated in foreign currency.

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